[JP,2002-141821,A]

Japanese (PDF) | File Wrapper Information

FULL CONTENTS CLAIM + DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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FULL CONTENTS

[Claim(s)]

[Claim 1]They are single superheterodyne type radio equipment or the radio equipment which has a single analog band pass filter for receiving band restrictions, Radio equipment provided with a calculating means which performs filter arithmetic using a digital filter which has characteristics contrary to the group delay frequency characteristics of said analog band pass filter, and a reception signal received in a self receive section.

[Claim 2]Double superheterodyne type radio equipment characterized by comprising the following, or radio equipment which has an analog band pass filter for two or more receiving band restrictions.

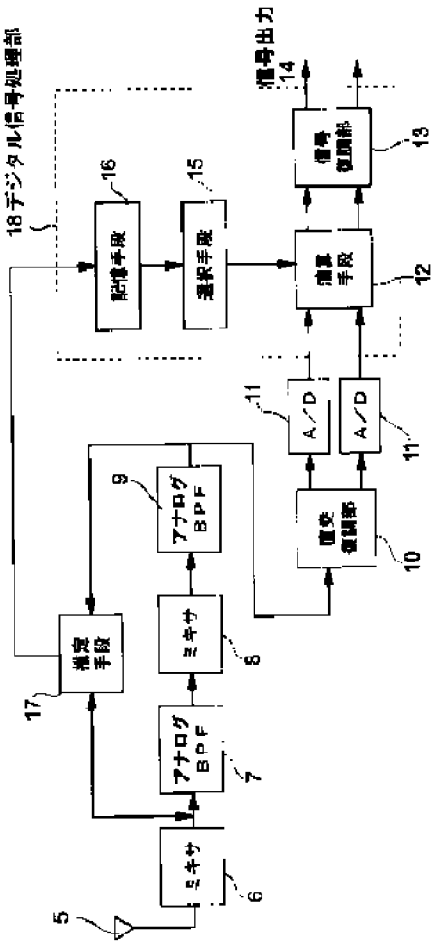
A digital filter which has characteristics contrary to a group delay overall characteristic which collected each group delay frequency characteristics of two or more of said analog band pass filters, or each group delay frequency characteristics.

A calculating means which performs filter arithmetic using a reception signal received in a self receive section.

[Claim 3]The radio equipment according to claim 1 or 2, wherein it has a

Drawing selection

Representative draw



[Translation done.]

memory measure holding a coefficient of said digital filter and said calculating means performs filter arithmetic based on a digital filter extracted from said memory measure.
[Claim 4]Said memory measure holds a coefficient of several digital filters from which characteristics differ, The radio equipment according to claim 3, wherein it has a selecting means which chooses a coefficient of optimal digital filter from said memory measure and said calculating means performs filter arithmetic based on a coefficient of a digital filter which said selecting means chose.
[Claim 5][of an analog band pass filter / arbitrary input output signals or output] The radio equipment according to claim 4, wherein it has an estimation means which presumes a coefficient of a digital filter which has the inverse characteristic of group delay frequency characteristics and said calculating means amends group delay frequency characteristics using a digital filter presumed by said estimation means.
[Claim 6]The radio equipment according to claim 5, wherein said selecting means has a means for switching which switches alternatively a coefficient of a digital filter presumed by a coefficient and said estimation means of a digital filter beforehand memorized by said memory measure.
[Claim 7]The radio equipment according to any one of claims 1 to 6, wherein said calculating means performs filter arithmetic by a complex operation using a digital filter which has characteristics contrary to the group delay frequency characteristics of said analog band pass filter, and a reception signal received in a receive section of radio equipment.
[Claim 8]The radio equipment according to any one of claims 1 to 6, wherein said calculating means performs filter arithmetic by a real number operation using a reception signal received in a real part coefficient of a digital filter and a receive section of radio equipment which have characteristics contrary to the group delay frequency characteristics of said analog band pass filter.
[Claim 9]Said calculating means collapses a digital filter which has characteristics contrary to the group delay frequency characteristics of said analog band pass filter in the existing digital filter, The radio equipment according to any one of claims 1 to 6 carrying out filter arithmetic using a collapsed digital filter and a reception signal received in a receive section of radio equipment.
[Claim 10]The radio equipment according to claim 9 which said existing digital filter is a Nyquist filter, and is characterized by performing simultaneously a compensation process of group delay frequency characteristics, and a compensation process of said Nyquist filter.
[Claim 11]The radio equipment comprising according to any one of claims 1 to 6:
Processing which said calculating means does a complex operation using a digital filter which has characteristics contrary to the group delay frequency characteristics of said analog band pass filter, and a reception signal received in a receive section of radio equipment, and performs filter arithmetic.
A data-processing selecting means which switches alternatively

processing which does a real number operation and performs filter arithmetic.

[Detailed Description of the Invention]
[0001]
[The technical field belonging to an invention] This invention relates to the radio equipment provided with the group-delay-frequency-characteristics amendment device which amends the group delay frequency characteristics of an analog filter especially about the radio equipment in digital wireless communication.
[0002]
[Description of the Prior Art]The analog PANDO path filter is used for the radio channel band limit with RF (Radio Frequency) belt and IF (Intermediate Frequency) belt from the former. However, the radio channel bandwidth in the conventional wireless system is wide, and since a cut-off characteristic is also loose and ends, the group delay frequency characteristics of an analog band pass filter do not cause judgment error rate increase of data decryption so much. Therefore, the simple LC resonance circuit [an analog PANDO path filter] etc. are used.
[0003]
[Problem to be solved by the invention]However, the intermediate part which narrow band-ization of a radio channel progresses from a viewpoint of frequency effective use, and originates in the steep cut-off characteristic of the analog band pass filter for separating adjacent channels in connection with it has been the evil on communication of a convex group delay distortion on both sides by the concave in recent years. That is, it is the cause of increasing the code judging error rate at the time of the linearity of band inner circumference wave number characteristics no longer being maintained by this group delay distortion, and performing data decryption.
[0004]The method of amending the group delay frequency characteristics of such an analog filter is proposed by the patent No. 2728244 gazette etc., for example. According to the art of this gazette, with the group delay equalizer which consists of LC resonance circuits, By making the single Mine-like characteristics which serve as convex between resonance frequency or between antiresonant frequency, and combining with the ceramics filter which has the conventional bimodal-like characteristics, few, and the linearity of band inner circumference wave number characteristics is raised. [by acquiring flat group delay frequency characteristics]
[0005]However, in the group delay equalizer which consists of an LC resonance circuit like the art of the above-mentioned gazette, although it needs to be adjusted for acquiring a predetermined frequency characteristic or the improvement of a frequency characteristic is made, there is fault, like the stability of a frequency characteristic is missing. In order to realize the group delay equalizer by the circuit element, the

circuit structure increases and there is also a possibility of causing the fall of a high cost or reliability.
[0006]The digital signal processing circuit about group-delay-frequency-characteristics amendment of an analog low pass filter is proposed by JP, H8-139601,A. According to the art of this gazette, group delay frequency characteristics are made flat using the digital all-pass filter which has group delay frequency characteristics contrary to the group delay frequency characteristics of an analog low pass filter.
[0007]However, although it is important in fields, such as speech processing, to amend the group delay frequency characteristics of the above analog low pass filters, the characteristics of the band pass filter in an IF band or RF belt, i.e., an intermediate part, must amend convex group delay frequency characteristics on both sides in radio equipment at a concave. Therefore, in the art of the above-mentioned gazette, the group delay frequency characteristics of the band pass filter which radio equipment needs cannot be amended.
[0008]This invention is made in view of such a situation, and, [the purpose] Can amend the group delay distortion of an analog band pass filter by digital signal processing, and the stability of a frequency characteristic is high, make it not need adjustment, and. It is in providing the radio equipment provided with the group-delay-frequency-characteristics amendment device which can be easily realized also by the conventional system, without increasing circuit structure.
[0009]
[Means for solving problem]In order to solve the above-mentioned technical problem, [the radio equipment of this invention] They are single superheterodyne type radio equipment or the radio equipment which has a single analog band pass filter for receiving band restrictions, It had the calculating means which performs filter arithmetic using the digital filter which has characteristics contrary to the group delay frequency characteristics of an analog band pass filter, and the reception signal received in the self receive section.
[0010]Namely, according to the radio equipment of this invention, an intermediate part uses the group delay frequency characteristics of the analog band pass filter whose both sides are convex in a concave, A calculating means performs filter arithmetic using the digital filter which has characteristics contrary to the group delay frequency characteristics of an analog band pass filter to the perverted reception signal. That is, the group delay frequency characteristics where the frequency characteristic was stabilized can be amended by forming the group-delay-frequency-characteristics amendment device which performs such filter arithmetic, and amending group delay distortion.
[0011]The radio equipment of this invention Double superheterodyne type radio equipment, Or it is the radio equipment which has an analog band pass filter for two or more receiving band restrictions, It had the calculating means which performs filter arithmetic using the digital filter which has characteristics contrary to the group delay overall characteristic which collected each group delay frequency characteristics of two or more analog band pass filters, or each group delay frequency

characteristics, and the reception signal received in the self receive section.
[0012]Namely, even if it is a case where double superheterodyne type radio equipment and the radio equipment which has an analog band pass filter for two or more receiving band restrictions are used according to the radio equipment of this invention, The completely same means as the case of above-mentioned single superheterodyne type radio equipment and the radio equipment which has a single analog band pass filter for receiving band restrictions can amend group delay frequency characteristics.
[0013]The radio equipment of this invention is further provided with the memory measure holding the coefficient of a digital filter in said invention, and a calculating means performs filter arithmetic based on the digital filter extracted from the memory measure.
[0014]That is, according to the radio equipment of this invention, when a calculating means performs filter arithmetic processing, group delay frequency characteristics are amended by memorizing the digital filter for which it asked beforehand to the memory measure, and calculating by the digital filter taken out from the memory measure. According to such a Method of amendment, quick group delay frequency characteristics with little arithmetic delay using hard logic etc. can be amended.
[0015]The radio equipment of this invention holds the coefficient of several digital filters from which a memory measure differs in characteristics in said invention, It has a selecting means which chooses the coefficient of the optimal digital filter from the memory measure, and a calculating means performs filter arithmetic based on the coefficient of the digital filter which the selecting means chose.
[0016]Namely, since according to the radio equipment of this invention the coefficient of the optimal digital filter is chosen and group delay frequency characteristics are amended, it can amend by always following the change of group delay frequency characteristics depending on a parameter.
[0017]In said invention, the radio equipment of this invention, [of an analog band pass filter / the arbitrary input output signals or output] It has an estimation means which presumes the coefficient of the digital filter which has the inverse characteristic of group delay frequency characteristics, and a calculating means amends group delay frequency characteristics using the digital filter presumed by the estimation means.
[0018]That is, according to the radio equipment of this invention, amendment which followed the time jitter of group delay frequency characteristics can be performed.
[0019]The radio equipment of this invention has a means for switching which switches alternatively the coefficient of the digital filter presumed by the coefficient and estimation means of the digital filter the selecting means is beforehand remembered to be by the memory measure in said invention.
[0020]That is, since it has the means for switching which switches alternatively the group delay inverse characteristic filter presumed by the estimation means, and the filter beforehand memorized to the memory

measure according to the radio equipment of this invention, group-delay-frequency-characteristics amendment of a reliable analog filter is realizable.

[0021]The radio equipment of this invention performs filter arithmetic by a complex operation in said invention using the digital filter in which a calculating means has characteristics contrary to the group delay frequency characteristics of an analog band pass filter, and the reception signal received in the receive section of radio equipment.

[0022]That is, according to the radio equipment of this invention, since filter arithmetic is performed by a complex operation and group delay frequency characteristics are amended, an operation amount is mitigable.

[0023]In said invention, a calculating means carries out filter arithmetic of the radio equipment of this invention by a real number operation using the reception signal received in the real part coefficient of a digital filter and the receive section of radio equipment which have characteristics contrary to the group delay frequency characteristics of an analog band pass filter.

[0024]That is, according to the radio equipment of this invention, since filter arithmetic is performed by a real number operation and group delay frequency characteristics are amended, an operation amount is mitigable.

[0025]The radio equipment of this invention collapses the digital filter in which a calculating means has characteristics contrary to the group delay frequency characteristics of an analog band pass filter in the existing digital filter in said invention, Filter arithmetic is carried out using the collapsed digital filter and the reception signal received in the receive section of radio equipment.

[0026]That is, since filter arithmetic is performed using the collapsed digital filter and the reception signal received in the receive section of radio equipment according to the radio equipment of this invention, an operation amount is mitigable.

[0027]As for the radio equipment of this invention, in said invention, the existing digital filter is a Nyquist filter and the compensation process of group delay frequency characteristics and the compensation process of a Nyquist filter are performed simultaneously.

[0028]That is, since a compensation process of group delay frequency characteristics and a compensation process of a Nyquist filter can be performed simultaneously according to radio equipment of this invention, compensation process time can be shortened.

[0029]In said invention, a digital filter in which a calculating means has characteristics contrary to the group delay frequency characteristics of an analog band pass filter, and a reception signal received in a receive section of radio equipment are used for radio equipment of this invention, It has a data-processing selecting means which switches alternatively processing which does a complex operation and performs filter arithmetic, and processing which does a real number operation and performs filter arithmetic.

[0030]That is, according to radio equipment of this invention, it becomes possible by switching suitably filter arithmetic by a complex operation, and filter arithmetic by a real number operation by a data-processing

selecting means to control an operation amount performed by a calculating means, and accuracy of group-delay-frequency-characteristics amendment.

[0031]

[Mode for carrying out the invention]Hereafter, although a group-delay-frequency-characteristics amendment device in radio equipment of this invention is explained using Drawings, the theory of operation of group-delay-frequency-characteristics amendment is described first. Drawing 1 is a principle figure of a group-delay-frequency-characteristics amendment device which searches for the inverse characteristic of the group delay frequency characteristics of an analog filter for performing group-delay-frequency-characteristics amendment. In the figure, a group-delay-frequency-characteristics amendment device is constituted by the input part 1 which inputs a signal, the analog filter 2 which has group delay frequency characteristics, the digital filter 3 which has group delay frequency characteristics and an inverse characteristic, and the outputting part 4 which sends out output with which group delay frequency characteristics were amended.

[0032]In the composition of such a group-delay-frequency-characteristics amendment device, if the input signal from the input part 1 passes the analog filter 2 now, the group delay distortion according to group delay frequency characteristics will be received. By passing the digital filter 3 which has the inverse characteristic of the group delay frequency characteristics of the analog filter 2, group-delay-frequency-characteristics amendment is performed and the signal by which frequency correction was carried out from the outputting part 4 can be outputted.

[0033]So that the impulse response of the whole system from the ON mosquito part 1 to the outputting part 4 may become an unit impulse, [by using recursive operation algorithms, such as LMS (Least Mean Square: least square average) and RLS (Recursive Least Squares),] If the coefficient of the digital filter 3 is adjusted, the digital filter 3 which has the inverse characteristic of the group delay frequency characteristics of the analog filter 2 will be obtained.

[0034]Thus, group-delay-frequency-characteristics amendment of an analog filter is realizable by having a calculating means which performs the digital filter coefficient obtained beforehand and filter arithmetic. If operation which creates the digital filter 3 which has the inverse characteristic of group delay frequency characteristics is performed by changing various parameters, The memory measure with which two or more digital filters 3 with a different group delay inverse characteristic are obtained, and remember two or more digital filters 3 to be, [by having the selecting means which chooses a digital filter coefficient according to the parameter value at the time of operation of the analog filter 2, and the digital filter selected by this selecting means and the calculating means which performs filter arithmetic processing] It is accurate and amendment which was stabilized and followed the group-delay-frequency-characteristics change with the parameter of the analog filter 2 can be realized.

[0035]It is also possible to perform group-delay-frequency-characteristics amendment which followed group-delay-frequency-characteristics change of the analog filter 2 by establishing the estimation means which presumes the digital filter 3 which has the inverse characteristic of the group delay frequency characteristics of the analog filter 2 from the input/output result of the analog filter 2.
[0036]Group-delay-frequency-characteristics amendment of a reliable analog filter is also realizable by establishing the selecting means which chooses the digital filter chosen from two or more digital filters held at the memory measure, and the digital filter presumed by the estimation means.
[0037]Next, although group-delay-frequency-characteristics amendment is explained using double superheterodyne type radio equipment, correction operation is also completely the same as when the radio equipment which has an analog band pass filter for two or more receiving band restrictions is used. Correction operation is also completely the same as when single superheterodyne type radio equipment and the radio equipment which has a single analog band pass filter for receiving band restrictions are used.
[0038]Drawing 2 is a block diagram of the 1 embodiment of the receive section of double superheterodyne type radio equipment. In drawing 2, [double superheterodyne type radio equipment] It is constituted by the antenna 5, the mixers 6 and 8, the analog band pass filters 7 and 9, the orthogonal demodulation part 10, the A/D conversion part 11, the estimation means 17 that presumes a digital filter coefficient, and the digital signal processing part 18.
[0039]The digital signal processing part 18 is constituted by the calculating means 12 which performs filter arithmetic, the signal demodulation section 13, the selecting means 15 which chooses a digital filter coefficient, and the memory measure 16 which memorizes a digital filter coefficient, and the signal output 14 is taken out. Arithmetic units, such as CPU (Central Processing Unit) and DSI (Dynamic Support Program), may be used for the digital signal processing part 18, and hard logic, such as GA (Grapple Adapter), may be used for it.
[0040]In drawing 2, the RF signal received with the antenna 5 is inputted into the mixer 6, and frequency conversion of it is carried out to the 1st intermediate frequency, and it is inputted into the analog band pass filter 7. The signal inputted into the analog band pass filter 7 is band-limited, and an intermediate part is inputted into the mixer 8 in response to a convex group delay distortion on both sides by a concave.
[0041]Frequency conversion of the signal inputted into the mixer 8 is carried out to the 2nd intermediate frequency, and it is inputted into the analog band pass filter 9. The signal inputted into the analog band pass filter 9 is band-limited again, and an intermediate part is inputted into the orthogonal demodulation part 10 in response to a convex group delay distortion on both sides by a concave.
[0042]And orthogonal demodulation is carried out simultaneously with frequency conversion, it separates into the in-phase component I and the

quadrature component Q, and the signal inputted into the orthogonal demodulation part 10 is inputted into the A/D conversion part 11, respectively. The A/D conversion of each signal inputted into the A/D conversion part 11 is carried out, respectively, and it is inputted into the digital signal processing part 18.

[0043]The reception signal inputted into the digital signal processing part 18 passes along the calculating means 12 and the signal demodulation section 13, and is taken out as the signal output 14.

[0044]Here, in the calculating means 12, the filter arithmetic processing which performs group-delay-frequency-characteristics amendment by a digital filter with the inverse characteristic of group delay frequency characteristics is made, and a signal recovery is made in the signal demodulation section 13.

[0045]The filter arithmetic processing which the calculating means 12 performs can perform group-delay-frequency-characteristics amendment by memorizing the digital filter for which it asked beforehand to the memory measure 16, and calculating by the digital filter taken out from this memory measure 16. According to such a Method of amendment, little quick group-delay-frequency-characteristics amendment of arithmetic delay using hard logic etc. is also possible.

[0046]It is possible to amend by following the change of group delay frequency characteristics depending on a parameter by establishing the selecting means 15 which chooses the optimal digital filter coefficient from the memory measure 16 which has memorized the single or multiple digital filter coefficient calculated beforehand.

[0047]The digital filter generated by the estimation means 17 which presumes the inverse characteristic of group delay frequency characteristics from the input output signal which sandwiched the output or the analog band pass filters 7 and 9 after passing the analog band pass filter 9 is used, It is also possible to process group-delay-frequency-characteristics amendment by the calculating means 12. Thereby, amendment which followed the time jitter of group delay frequency characteristics can be performed.

[0048]Such an estimation means 12 inputs a pulse into the input stage of the analog band pass filter 7, for example, It is presuming by the method of presuming the inverse characteristic of group delay frequency characteristics from the output of the analog band pass filter 9 at that time, the method of presuming the inverse characteristic of group delay frequency characteristics from the appearance mosquito signal data after passing the received analog band pass filters 7 and 9 of an input signal, etc.

[0049]Drawing 3 is a block diagram of other embodiments of the receive section of double superheterodyne type radio equipment. That is, this embodiment differs only in the place which brought the estimation means 17 in the digital signal processing part 18 to the embodiment shown in drawing 2. Therefore, as shown in drawing 3, the method of presuming the inverse characteristic of group delay frequency characteristics also has the estimation means 12 from the receive data of the output stage of the A/D conversion part 11.

[0050]It is also possible to give the means for switching which switches alternatively the group delay inverse characteristic filter presumed by the estimation means 17 and the filter beforehand memorized to the memory measure to the selecting means 15. Thereby, group-delay-frequency-characteristics amendment of a reliable analog filter is realizable.
[0051]Drawing 4 is a block diagram showing the composition of a 1st embodiment of the calculating means 12 shown in drawing 2 and drawing 3. [in drawing 4] [the I data 19 of the in-phase component by which the A/D conversion was carried out after the orthogonal demodulation of an input signal, and the Q data 20 of the quadrature component by which the A/D conversion was carried out after the orthogonal demodulation of an input signal] Respectively, data processing is carried out to the real part filter factor (Fi) 21 of a digital filter, and the imaginary part filter factor (Fq) 22 of a digital filter, and it is inputted into the signal demodulation section 23. That is, data processing of a complex filter is made by a digital filter, and the I data 19 of an in-phase component and the Q data 20 of a quadrature component are inputted into the signal demodulation section 23. That is, according to a 1st embodiment shown in drawing 4, after a calculating means performs filter arithmetic according to a complex operation using the digital filter which has characteristics contrary to the group delay frequency characteristics of an analog band pass filter, and the reception signal received in the receive section of radio equipment, it has inputted into the signal demodulation section.
[0052]Drawing 5 is a block diagram showing composition of a 2nd embodiment of the calculating means 12 shown in drawing 2 and drawing 3. In drawing 5, data processing of the I data 19 of an in-phase component and the Q data 20 of a quadrature component is carried out to the real part filter factor (Fi) 21 of a digital filter, and they are inputted into the signal demodulation section 23. Therefore, according to a 2nd embodiment shown in drawing 5, a calculating means carries out filter arithmetic using a real part coefficient of a digital filter which has characteristics contrary to the group delay frequency characteristics of an analog band pass filter, and a reception signal received in a receive section of radio equipment.
[0053]Thus, it becomes possible by making data processing of a real part filter by a digital filter, and inputting the I data 19 and the Q data 20 into a signal demodulation section to reduce an operation amount.
[0054]Drawing 6 is a block diagram showing the composition of a 3rd embodiment of the calculating means 12 shown in drawing 2 and drawing 3. In drawing 6, [the I data 19 of an in-phase component, and the Q data 20 of a quadrature component] It is inputted into the signal demodulation section 23 after data processing is inputted and carried out to the digital filter of Fi* route nyquist 24 which collapsed the real part digital filter coefficient (Fi) in the existing digital filter (for example, route Nyquist filter).
[0055]That is, a group-delay-frequency-characteristics compensation

process and Nyquist filter processing are simultaneously performed by Fi* route nyquist 24, and the I data 19 and the Q data 20 are inputted into the signal demodulation section 23. Therefore, according to a 3rd embodiment shown in drawing 6, a calculating means collapses the digital filter which has characteristics contrary to the group delay frequency characteristics of an analog band pass filter in the existing digital filter, After carrying out filter arithmetic of the collapsed digital filter and the reception signal received in the receive section of radio equipment, it inputs into the signal demodulation section 23.

[0056]Drawing 7 is a block diagram showing the composition of a 4th embodiment of the calculating means 12 shown in drawing 2 and drawing 3. That is, the data-processing selecting means 25 which chooses digital filter data processing is added to the composition of a 1st embodiment that shows drawing 4 a 4th embodiment shown in drawing 7. That is, in a 4th embodiment shown in drawing 7, the filter arithmetic by the complex operation of a 1st embodiment shown in drawing 4 and the filter arithmetic by the real number operation of a 2nd embodiment shown in drawing 5 are alternatively switched by the data-processing selecting means 25. Thus, it becomes possible by switching the method of data processing by the data-processing selecting means 25 to control the operation amount performed by a calculating means, and the accuracy of group-delay-frequency-characteristics amendment.

[0057]Drawing 8 is the characteristics figure measured in the radio equipment by which a signal input is carried out to the digital filter of Fi* route nyquist 24 shown in drawing 6, and data processing is carried out to it. That is, this characteristics figure is a characteristic curve which shows the relation of BER (Bit Error Rate) of a vertical axis to the received input voltage of a horizontal axis.

[0058]In drawing 8, (a) is data before group-delay-frequency-characteristics amendment, and (b) is data after group-delay-frequency-characteristics amendment. It turns out that the crevice of BER does not almost have received input voltage in near 20 - 50dBmuV (getting it blocked and the increase in a code judging error suppressed), and the effect of group-delay-frequency-characteristics amendment appears by amendment of the group delay frequency characteristics by this invention so that clearly from a figure. Thus, few, and the linearity of band inner circumference wave number characteristics is raised. [by acquiring flat group delay frequency characteristics]

[0059]

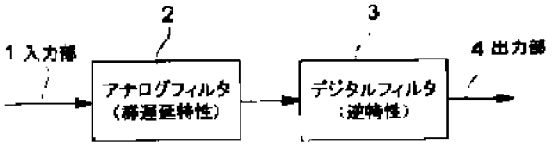
[Effect of the Invention]As stated above, according to the radio equipment of this invention, moreover, when amending group delay frequency characteristics, it is not necessary to perform adjustment for acquiring predetermined characteristics, and the stability of a frequency characteristic is high. By software, since amendment is realizable, the circuit structure of a system does not increase group delay frequency characteristics, either. Since the operation time by the compensation process of group delay frequency characteristics can be shortened by

collapsing the inverse characteristic filter of group delay frequency characteristics in the existing digital filter, the time delay by a compensation process does not increase. Creation of a digital filter can perform adaptation to the conventional radio equipment easily.

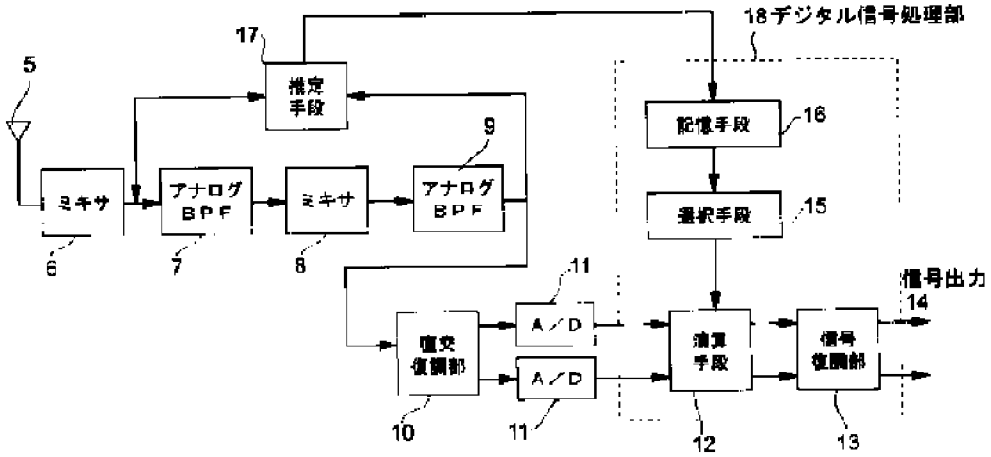
[Brief Description of the Drawings]
[Drawing 1]The principle figure of the group-delay-frequency-characteristics amendment device which searches for the inverse characteristic of the group delay frequency characteristics of an analog filter for performing group-delay-frequency-characteristics amendment
[Drawing 2]The block diagram of the 1 embodiment of the receive section of double superheterodyne type radio equipment
[Drawing 3]The block diagram of other embodiments of the receive section of double superheterodyne type radio equipment
[Drawing 4]The block diagram showing the composition of a 1st embodiment of the calculating means 12 shown in drawing 2 and drawing 3
[Drawing 5]The block diagram showing the composition of a 2nd embodiment of the calculating means 12 shown in drawing 2 and drawing 3
[Drawing 6]The block diagram showing the composition of a 3rd embodiment of the calculating means 12 shown in drawing 2 and drawing 3
[Drawing 7]The block diagram showing the composition of a 4th embodiment of the calculating means 12 shown in drawing 2 and drawing 3
[Drawing 8]The characteristics figure measured in the radio equipment by which a signal input is carried out to the digital filter of Fi* route nyquist 24 shown in drawing 6, and data processing is carried out to it
[Explanations of letters or numerals]
1 Input part
2 Analog filter
3 Digital filter
4 Outputting part
5 Antenna
6 and 8 Mixer
7 and 9 Analog band pass filter
10 Orthogonal demodulation part
11 A/D conversion part
12 Calculating means
13 Signal demodulation section
14 Signal output
15 Selecting means
16 Memory measure
17 Estimation means

18 Digital signal processing part
19 I data
20 Q data
21 Real part filter factor (Fi)
22 Imaginary part filter factor (Fq)
23 Signal demodulation section
24 Fi* route nyquist
25 Data-processing selecting means

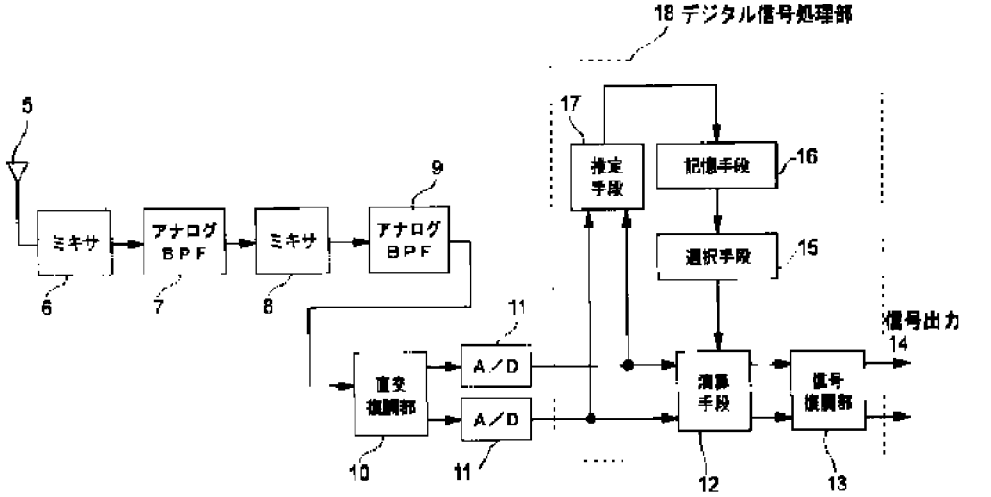
[Drawing 1]



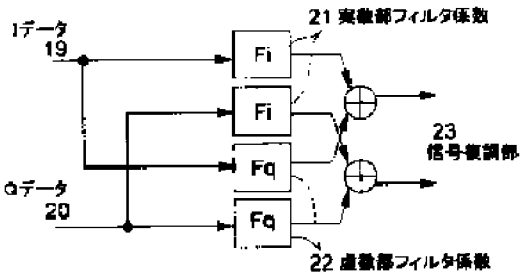
[Drawing 2]



[Drawing 3]

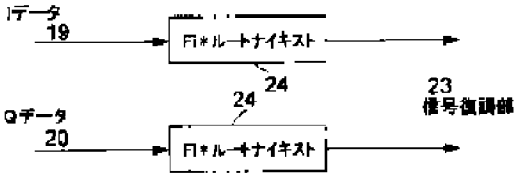


[Drawing 4]

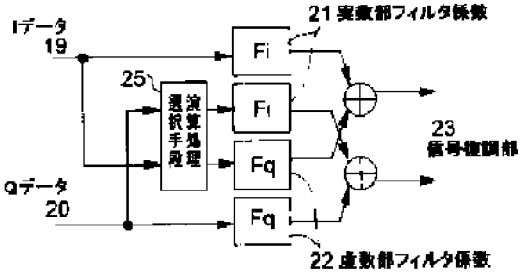


[Drawing 5]

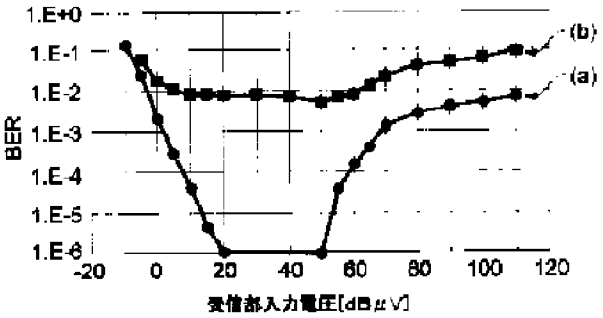
[Drawing 6]



[Drawing 7]



[Drawing 8]



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